

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE  
PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A priority encoder (PE) for a CAM, comprising:
  - a plurality of PE blocks, each receiving a plurality of match results corresponding to data entries in a corresponding data array block and, for determining an address of a highest priority data entry based on a physical location in the data array block during a CAM search-and-compare operation;
  - a register for storing a user defined priority value assigned to each PE block; and
  - means for evaluating priority values and the address determined by said plurality of PE blocks to select a PE block having the highest priority data entry.
2. A priority encoder as defined in claim 1, including a plurality of stages, said PE blocks being a first stage of said PE.
3. A method for selecting the highest priority entry in a CAM upon receiving a search- and-compare instruction comprising the steps of:
  - receiving in each of a plurality of PE blocks in a first stage of a PE, a plurality of match results corresponding to data entries in a corresponding data array block and determining an address of the highest priority data entry based on a physical location in the data array block during a CAM search-and-compare operation;
  - storing in register a user defined priority value assigned to each PE block;
  - forwarding the assigned priority value of a PE block to a PE unit in a next stage upon the PE block determining at least one match entry;
  - selecting a PE block having the highest priority entry by evaluating priority values and said determined addresses from the plurality of PE blocks; and,
  - selecting the highest priority entry in the selected PE block based on said physical location.

4. A method for selecting the highest priority entry in a CAM, said method comprising the steps of:

providing a priority encoder having a plurality of columns of sub-blocks connected in rows, each sub-block having a register to store a priority value defined by a user;

determining the highest priority data entry within a sub-block upon receiving a search and compare instruction;

comparing a priority value stored in register in the sub-block with a priority value forwarded from a sub-block in previous column in a row when a local and forwarded match flags are enabled; and,

selecting a priority value and a match address to forward to a sub-block in next column in the row based on said comparison result.

5. A method for inserting priority data in a CAM having a plurality of data array blocks, said method comprising the steps of:

- a) determining the priority of said data to be inserted relative to the priority of data stored in said CAM;
- b) providing a priority value register associated with each of said blocks;
- c) determining a free block for insertion of said data
- d) writing said data to said block; and
- e) updating said priority value registers to reflect said relative priority of said inserted data.